

RECEIVED

APR 15 2002

TECH CENTER 1600/2900



Webber  
1645

**RAW SEQUENCE LISTING** DATE: 04/08/2002  
**PATENT APPLICATION:** US/09/591,447C TIME: 16:09:02

Input Set : A:\Sequence Listing 09591,447.txt  
Output Set: N:\CRF3\04082002\I591447C.raw

3 <110> APPLICANT: Chatfield, Steven N  
4 Dougan, Gordon  
5 Sydenham, Mark  
7 <120> TITLE OF INVENTION: Vaccines Containing Attenuated Bacteria  
9 <130> FILE REFERENCE: KCO1003US  
11 <140> CURRENT APPLICATION NUMBER: US 09/591,447C  
C--> 12 <141> CURRENT FILING DATE: 2000-06-09  
14 <150> PRIOR APPLICATION NUMBER: UK 9726233.1  
15 <151> PRIOR FILING DATE: 1997-12-11  
17 <160> NUMBER OF SEQ ID NOS: 4  
19 <170> SOFTWARE: MS-DOS  
21 <210> SEQ ID NO: 1  
22 <211> LENGTH: 1287  
23 <212> TYPE: DNA  
24 <213> ORGANISM: Salmonella typhimurium  
26 <400> SEQUENCE: 1  
28 atgaagaact ggaaaacgct gtttcgggt atcgccatga tcgcgaatac cagtttcgt  
30 gccccccagg tagtcataa agtcgcagcc gtcgtcaata atggcgctgt gctggaaagc  
32 gacgttgcgt gcttaatgca atcagtcaaa ctcaacgcgg gtcaggcagg tcagcagctt  
34 ccggacgacg coacgcgtcg tcaccagatc ctggaacgtt tgattatgga tcaaattatc  
36 ctgcagatgg gtcagaagat ggggtgaag atcacggatg agcagttgga tcagccatca  
38 gccaacatcg ccaaacaaaa caatatgacg atggatcaga tgccgagccg tctggcttac  
40 gatgggctga actattcaac ctacgtaac cagattcgtt aagagatgtat tatctctgaa  
42 gtgcgcacaaca atgagggttg tcgcgtatc accgtttgc cgcaagaagt tgacgcgtg  
44 gcaaaacaga ttggcaccca aaacgatgcc agcaccgagc tgaacctgag ccatatctg  
46 attgctctgc cggaaaaccc aaccccgag caggttaacg acgcccgcg ccaggcggaa  
48 agcattgttg aagaagcgcg taacggcgca gatttcggca aactggcgat tacctactct  
50 gccgaccacgc aggcgtctaaa aggcggtcag atgggctggg gccgtatcca ggagctggcg  
52 gggattttcg cccaggcgct gagcaccgcg aagaaaggcg acattgtcg ccggattcgc  
54 tccggcgctg gttccacat tctgaaagta aatgacgtcg gcggtcagag ccagagtatc  
56 tccgtgaccg aagttcacgc tcgtcacatt ctgtttaagc cgtcgccgat catgaacgat  
58 cagcaggcgc gcctgaagct ggaagaaatc gcggctgaca ttaagagtgg taaaaccacc  
60 ttggccgctg cggcgaaaga gtactctcg gacccgggttcc cgcttaacca gggcggtgat  
62 ttgggttggg ctaacgcccaga tattttcgac cggcggttcc gcgacgcgc aacgaagctg  
64 cataaaggcc aaataagcgc gccggatcac tccctttcg gctggcatct gatcgaattt  
66 ctggataacgc gtaaggtaga caaaaccgat gccggcgcaga aagatcgcgc ttatcgatg  
68 ctgatgaacc gtaaaattctc agaagaagcg gcgacctgga tgcaagaaca gcgccact  
70 tacgttaaga ttttgagttaa ctaatga  
73 <210> SEQ ID NO: 2  
74 <211> LENGTH: 427  
75 <212> TYPE: PRT  
76 <213> ORGANISM: Salmonella typhimurium  
78 <400> SEQUENCE: 2

**ENTERED**

**RAW SEQUENCE LISTING**  
**PATENT APPLICATION: US/09/591,447C**

**DATE: 04/08/2002**  
**TIME: 16:09:02**

**Input Set : A:\Sequence Listing 09591,447.txt**  
**Output Set: N:\CRF3\04082002\I591447C.raw**

```

80 Met Lys Asn Trp Lys Thr Leu Leu Leu Gly Ile Ala Met Ile Ala Asn
81     1           5           10          15
83 Thr Ser Phe Ala Ala Pro Gln Val Val Asp Lys Val Ala Ala Val Val
84           20          25          30
86 Asn Asn Gly Val Val Leu Glu Ser Asp Val Asp Gly Leu Met Gln Ser
87           35          40          45
89 Val Lys Leu Asn Ala Gly Gln Ala Gly Gln Gln Leu Pro Asp Asp Ala
90           50          55          60
92 Thr Leu Arg His Gln Ile Leu Glu Arg Leu Ile Met Asp Gln Ile Ile
93   65           70           75          80
95 Leu Gln Met Gly Gln Lys Met Gly Val Lys Ile Thr Asp Glu Gln Leu
96           85           90          95
98 Asp Gln Pro Ser Ala Asn Ile Ala Lys Gln Asn Asn Met Thr Met Asp
99           100          105         110
101 Gln Met Arg Ser Arg Leu Ala Tyr Asp Gly Leu Asn Tyr Ser Thr Tyr
102    115          120          125
104 Arg Asn Gln Ile Arg Lys Glu Met Ile Ile Ser Glu Val Arg Asn Asn
105    130          135          140
107 Glu Val Arg Arg Arg Ile Thr Val Leu Pro Gln Glu Val Asp Ala Leu
108  145          150          155          160
110 Ala Lys Gln Ile Gly Thr Gln Asn Asp Ala Ser Thr Glu Leu Asn Leu
111           165          170          175
113 Ser His Ile Leu Ile Ala Leu Pro Glu Asn Pro Thr Ser Glu Gln Val
114           180          185          190
116 Asn Asp Ala Gln Arg Gln Ala Glu Ser Ile Val Glu Glu Ala Arg Asn
117           195          200          205
119 Gly Ala Asp Phe Gly Lys Leu Ala Ile Thr Tyr Ser Ala Asp Gln Gln
120    210          215          220
122 Ala Leu Lys Gly Gly Gln Met Gly Trp Gly Arg Ile Gln Glu Leu Pro
123  225          230          235          240
125 Gly Ile Phe Ala Gln Ala Leu Ser Thr Ala Lys Lys Gly Asp Ile Val
126           245          250          255
128 Gly Pro Ile Arg Ser Gly Val Gly Phe His Ile Leu Lys Val Asn Asp
129           260          265          270
131 Leu Arg Gly Gln Ser Gln Ser Ile Ser Val Thr Glu Val His Ala Arg
132           275          280          285
134 His Ile Leu Leu Lys Pro Ser Pro Ile Met Asn Asp Gln Gln Ala Arg
135           290          295          300
137 Leu Lys Leu Glu Glu Ile Ala Ala Asp Ile Lys Ser Gly Lys Thr Thr
138  305          310          315          320
140 Phe Ala Ala Ala Lys Glu Tyr Ser Gln Asp Pro Gly Ser Ala Asn
141           325          330          335
143 Gln Gly Gly Asp Leu Gly Trp Ala Thr Pro Asp Ile Phe Asp Pro Ala
144           340          345          350
146 Phe Arg Asp Ala Leu Thr Lys Leu His Lys Gly Gln Ile Ser Ala Pro
147           355          360          365
149 Val His Ser Ser Phe Gly Trp His Leu Ile Glu Leu Leu Asp Thr Arg
150           370          375          380
152 Lys Val Asp Lys Thr Asp Ala Ala Gln Lys Asp Arg Ala Tyr Arg Met

```

RAW SEQUENCE LISTING  
PATENT APPLICATION: US/09/591,447C

DATE: 04/08/2002  
TIME: 16:09:02

Input Set : A:\Sequence Listing 09591,447.txt  
Output Set: N:\CRF3\04082002\I591447C.raw

153	385	390	395	400													
155	Leu	Met	Asn	Arg	Lys	Phe	Ser	Glu	Glu	Ala	Ala	Thr	Trp	Met	Gln	Glu	
156					405					410					415		
158	Gln	Arg	Ala	Thr	Tyr	Val	Lys	Ile	Leu	Ser	Asn						
159					420				425								
162	<210>	SEQ ID NO:	3														
163	<211>	LENGTH:	1287														
164	<212>	TYPE:	DNA														
165	<213>	ORGANISM:	Escherichia coli														
167	<400>	SEQUENCE:	3														
169	atgaagaact	ggaaaaacgct	gcttctcggt	atcgccatga	tcgcgaatac	cagttcgct											60
171	gcccccagg	tagtcgataa	agtgcagcc	gtcgtaata	acggcgctgt	gctggaaagc											120
173	gacgttgatg	gattaatgca	gtcgtaaaa	ctgaacgctg	ctcaggcaag	gcagcaactt											180
175	octgatgacg	cgacgctgctg	ccaccataatc	atggAACGTT	tgtatcatgga	tcaaatttatt											240
177	ctgcagatgg	ggcagaaaaat	gggagtggaa	atctccgatg	agcagctgga	tcaggcgatt											300
179	gctaacatcg	cgaaaacagaa	caacatgacg	ctggatcaga	tgcgccggc	tctggcttac											360
181	gatggactga	actacaacac	ctatcgtaac	cagatccgca	aagagatgat	tatctctgaa											420
183	gtgcgttaaca	acgaggtgctg	tgcgtcgatc	accatctgc	cgcaggaaat	cgaatccctg											480
185	gcgcagcagg	tggtaacca	aaacgacgct	agcaactgac	tgaacctgag	ccacatccctg											540
187	atcccgtgc	cggaaaaccc	gacctctgtat	caggtgaacg	aagcggaaag	ccaggcgccgc											600
189	gccattgtcg	atcaggcgctg	taacggcgct	gatttcggta	agctggcgat	tgctcatttct											660
191	gccgaccagc	aggcgctgaa	cgccggccag	atggctgg	gccgtattca	ggagttgccc											720
193	gggatcttcg	cccaggcatt	aagcaccgcg	aagaaaggcg	acattgtgg	cccgatttctg											780
195	tccggcggtg	gcttccatat	tctgaaaggat	aacgacctgc	gcggcgaaag	caaaaatatac											840
197	tcgggtgaccc	aagttcatgc	tcgccccattt	ctgctgaaac	cgtccggat	catgactgac											900
199	gaacaggccc	gtgtgaaact	ggaacagatt	gctgctgata	tcgagatgg	taaaacgact											960
201	tttgcgtccg	caacgaaaga	gttctctcag	gatccagttt	ctgcttaacc	ggccggcgat											1020
203	ctcggtctgg	ctacaccaga	tattttcgtat	ccggccctcc	gtgacgcctt	gactcgccct											1080
205	aacaaaggctc	aatgagtgc	accgggttac	tcttcattcg	gctggcattt	aatcgaactg											1140
207	ctggataaccc	gtaatgtcga	taaaaccgac	gctgcgcaga	aagatcgatc	ataccgcatt											1200
209	ctgatgaacc	gtaagttctc	gaaagaagca	gcaagctgga	tgcaggaaca	acgtgccagc											1260
211	gcctacgtta	aaatcctgag	caactaa														1287
214	<210>	SEQ ID NO:	4														
215	<211>	LENGTH:	428														
216	<212>	TYPE:	PRT														
217	<213>	ORGANISM:	Escherichia coli														
219	<400>	SEQUENCE:	4														
221	Met	Lys	Asn	Trp	Lys	Thr	Leu	Leu	Leu	Gly	Ile	Ala	Met	Ile	Ala	Asn	
222	1				5				10					15			
224	Thr	Ser	Phe	Ala	Ala	Pro	Gln	Val	Val	Asp	Lys	Val	Ala	Ala	Val	Val	
225						20			25				30				
227	Asn	Asn	Gly	Val	Val	Leu	Glu	Ser	Asp	Val	Asp	Gly	Leu	Met	Gln	Ser	
228						35			40			45					
230	Val	Lys	Leu	Asn	Ala	Ala	Gln	Ala	Arg	Gln	Gln	Leu	Pro	Asp	Asp	Ala	
231						50			55			60					
233	Thr	Leu	Arg	His	Gln	Ile	Met	Glu	Arg	Leu	Ile	Met	Asp	Gln	Ile	Ile	
234	65					70				75			80				
236	Leu	Gln	Met	Gly	Gln	Lys	Met	Gly	Val	Lys	Ile	Ser	Asp	Glu	Gln	Leu	
237						85			90			95					

RAW SEQUENCE LISTING  
PATENT APPLICATION: US/09/591,447C

DATE: 04/08/2002  
TIME: 16:09:02

Input Set : A:\Sequence Listing 09591,447.txt  
Output Set: N:\CRF3\04082002\I591447C.raw

239 Asp Gln Ala Ile Ala Asn Ile Ala Lys Gln Asn Asn Met Thr Leu Asp  
240 100 105 110  
242 Gln Met Arg Ser Arg Leu Ala Tyr Asp Gly Leu Asn Tyr Asn Thr Tyr  
243 115 120 125  
245 Arg Asn Gln Ile Arg Lys Glu Met Ile Ile Ser Glu Val Val Arg Asn Asn  
246 130 135 140  
248 Glu Val Arg Arg Arg Ile Thr Ile Leu Pro Gln Glu Val Glu Ser Leu  
249 145 150 155 160  
251 Ala Gln Gln Val Gly Asn Gln Asn Asp Ala Ser Thr Glu Leu Asn Leu  
252 165 170 175  
254 Ser His Ile Leu Ile Pro Leu Pro Glu Asn Pro Thr Ser Asp Gln Val  
255 180 185 190  
257 Asn Glu Ala Glu Ser Gln Ala Arg Ala Ile Val Asp Gln Ala Arg Asn  
258 195 200 205  
260 Gly Ala Asp Phe Gly Lys Leu Ala Ile Ala His Ser Ala Asp Gln Gln  
261 210 215 220  
263 Ala Leu Asn Gly Gly Gln Met Gly Trp Gly Arg Ile Gln Glu Leu Pro  
264 225 230 235 240  
266 Gly Ile Phe Ala Gln Ala Leu Ser Thr Ala Lys Lys Gly Asp Ile Val  
267 245 250 255  
269 Gly Pro Ile Arg Ser Gly Val Gly Phe His Ile Leu Lys Val Asn Asp  
270 260 265 270  
272 Leu Arg Gly Glu Ser Lys Asn Ile Ser Val Thr Glu Val His Ala Arg  
273 275 280 285  
275 His Ile Leu Leu Lys Pro Ser Pro Ile Met Thr Asp Glu Gln Ala Arg  
276 290 295 300  
278 Val Lys Leu Glu Gln Ile Ala Ala Asp Ile Glu Ser Gly Lys Thr Thr  
279 305 310 315 320  
281 Phe Ala Ala Ala Thr Lys Glu Phe Ser Gln Asp Pro Val Ser Ala Asn  
282 325 330 335  
284 Gln Gly Gly Asp Leu Gly Trp Ala Thr Pro Asp Ile Phe Asp Pro Ala  
285 340 345 350  
287 Phe Arg Asp Ala Leu Thr Arg Leu Asn Lys Gly Gln Met Ser Ala Pro  
288 355 360 365  
290 Val His Ser Ser Phe Gly Trp His Leu Ile Glu Leu Leu Asp Thr Arg  
291 370 375 380  
293 Asn Val Asp Lys Thr Asp Ala Ala Gln Lys Asp Arg Ala Tyr Arg Met  
294 385 390 395 400  
296 Leu Met Asn Arg Lys Phe Ser Glu Glu Ala Ala Ser Trp Met Gln Glu  
297 405 410 415  
299 Gln Arg Ala Ser Ala Tyr Val Lys Ile Leu Ser Asn  
300 420 425

**VERIFICATION SUMMARY**

PATENT APPLICATION: US/09/591,447C

DATE: 04/08/2002

TIME: 16:09:03

Input Set : A:\Sequence Listing 09591,447.txt  
Output Set: N:\CRF3\04082002\I591447C.raw

L:12 M:271 C: Current Filing Date differs, Replaced Current Filing Date